

6/PRTS

0889665 08407  
JC17 Rec'd PCT/PTO 19 JUL 2001

ASW  
JAN 4, 2002

## SPECIFICATION

### ELEVATOR SYSTEM

#### TECHNICAL FIELD

This invention relates to an elevator system and, in particular, to an elevator system having a control panel within the hoistway.

#### BACKGROUND ART

In a conventional elevator system, a hoist, a control panel and the like are installed in a machine room disposed above the hoistway, so that an installation space for the machine room must be maintained at the highest portion of the building, thus decreasing the utility efficiency of the building and the height of the building inevitably increases.

On the other hand, an elevator system with no machine room is proposed in which, as shown in Figs. 5 and 6 for example, the hoist and the control panel are installed in an overlapping relationship within a gap defined between the hoistway wall and the travel region of the car which is a moving member. In the figures, the reference numeral 1 is a hoistway, 2 is an elevator car which is a member ascending and descending within the hoistway, 3 is a hoist for driving the car 2 up and down, 4 is a main rope wound on the hoist 3 for supporting the car 2, 5 is a counter weight supported on the main rope 4 at the opposite side of the car 2, 6 is a control panel for driving and controlling the hoist 3, 7 are car guide rails disposed for guiding the car 2 moving up and down, 8 are counter weight guide rails for guiding the counter weight 5 moving up and down along the hoist way, 9 is a landing floor at which the passengers enter into and exit from the elevator car 2, 10 is a floor door disposed at the landing floor 9, 11 is a car door mounted to the car 2 and opened and closed in connection with the landing floor door 10, and 12 is a door mechanism for supporting the car door 11 and operating with the car door 11 suspended therefrom.

Also, Japanese Patent Laid-open No. 7-10434 (corresponding to European Patent Application EP 0631967) discloses an elevator system in which the hoist and the control panel are mounted at the highest portion of the hoistway and the machine room is eliminated. Also, Japanese Patent Laid-Open No. 7-10437 (corresponding to European Patent Application No. EP 0631968) discloses an elevator system in which the hoist and the control panel are installed at the bottom portion of the hoistway and the machine room is eliminated. However, in these elevator systems, even though the machine room can be eliminated, the height of the hoistway may be increased or the horizontal projection area of the hoistway may be increased.

Further, Japanese Laid-Open No. 8-40675 (corresponding to European Patent Application EP 0680920) discloses the housing of the main portion of the drive unit including the control panel within the depth of the cave formed in the side wall of the hoistway. With this measure, however, depth or the thickness of the drive unit that should be housed within the cave must be limited in the direction of the hoistway side wall thickness, resulting in difficulties in designing the configuration of the drive unit. Also, with this structure, the side of the drive unit opposite to the hoistway inevitably faces to rooms or passages adjacent to the hoistway, making it necessary to provide a counter measure for the elevator noise.

#### DISCLOSURE OF INVENTION

This invention has been made to solve the above-discussed problems of the conventional design and has as its object the provision of an elevator system having a reduced burden on the building and an improved utility efficiency without the need for the opening in the hoistway walls except for the entrance and exit and by making the height of the building small.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will become more readily apparent from the following detailed description of the preferred embodiments of the present invention taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a perspective view of an elevator system of the first embodiment of the present invention;

→ Fig. 2 is a vertical sectional view of an elevator system of the first embodiment of the present invention;

Fig. 3 is a vertical sectional view of the top portion of the hoistway of an elevator system of the second embodiment of the present invention;

SUB A1> Fig. 4 is a plan view of the hoistway as viewed from the above of the elevator hoistway of the second embodiment of the present invention;

→ Fig. 5 is a perspective view of a conventional elevator system; and

SUB A2> Fig. 6 is a plan view of the hoistway as viewed from the above of the elevator hoistway of the elevator system shown in Fig. 5.

### BEST MODE FOR CARRYING OUT THE INVENTION

The best mode of the present invention will now be described with reference to the accompanying drawings.

#### Embodiment 1

Fig. 1 is a perspective view of an elevator system of the first embodiment of the present invention and Fig. 2 is a vertical sectional view of an elevator system of the present invention. In the figures, the same components designated by the same reference characters as those in Figs. 5 and 6 in connection with the background art are identified by the same reference characters. The reference characters 1 is a hoistway, 2 is an elevator car which is a member ascending and descending within the hoistway, 3 is a hoist for driving the car 2 up and down, 4 is a main rope wound on the hoist 3 for supporting the car 2, 5 is a counter weight supported on the main rope 4 at the opposite side of the car 2, 6 is a control panel for driving and controlling the hoist 3, 7 are car guide rails disposed for guiding the car 2 moving up and down, 8 are counter weight guide rails for guiding the counter weight 5 moving up and down along the hoist way, 9 is a landing floor at which the passengers enter into and exit from the elevator car 2, 10 is a floor door disposed at the landing floor 9, 11 is a car door mounted to the car 2 and opened and closed in connection with the landing floor door 10, and 12 is a door mechanism for supporting the car door 11 and operating with the car door 11 suspended therefrom. 13 is a car sill for guiding the car door 11 sliding between the open and closed positions, 14 is a landing floor door mechanism for supporting the landing floor door 10 therefrom, 15 is a landing floor sill for guiding the landing floor door 10 sliding between the

open and closed position, 16 is a building structural member projecting into the hoistway 1 for supporting the landing floor sill 15 thereon, and 17 is an opening portion provided in the hoistway 1 for providing the access to the elevator car 2.

In the elevator system with such the structure, the control panel 6 for driving and controlling the hoist 3 is installed within the hoistway 1 and within a region defined by a vertical projection to a horizontal plane of an overhang portion which is a portion projected into the hoistway such as the landing floor mechanism 14, the landing floor sill 15 and the building structure member 16, so that it cannot interfere with the region within the hoistway in which the moving member such as the car 2. Also, at the landing floor opening 17 at which no vertically elongated members such as the main rope, the governor rope, the guide rails and the like are present so that they do not interfere, so that it cannot happen that the control panel installed above the entrance opening interferes the above-mentioned members and that the maintenance of the control panel is not impeded. Further, when the control panel is positioned above the opening in a similar manner, the maintenance of the control panel above the opening portion can be easily carried out by moving the car to the position allowing the personnel to ride on the car top, then the power source is interrupted to stop the car and then the landing floor door is opened from the landing floor side, ride on the car top which serves as the foothold to achieve the maintenance of the control panel above the opening portion.

## Embodiment 2

While the control panel 6 is disposed between two floors with landings in the first embodiment shown in Fig. 2, the control panel may also be disposed above the landing floor of the top-most floor as illustrated in Fig. 3 for example. In this case, a control panel having a large horizontal thickness beyond the projection portions from the hoistway wall can be used by positioning it above the travel path or higher than the top end of the travel of the elevator car.

Fig. 3 is a vertical sectional view of the top portion of the hoistway of an elevator system of the second embodiment of the present invention, and Fig. 4 is a plan view of the hoistway as viewed from the above of the elevator hoistway of the second embodiment of the present invention. In the figures, the same components designated by the same reference characters are identified by the

Fig. 1 or Fig. 3

same reference characters. The reference character 17 is the top-most landing floor, 18 is the ceiling of the top portion of the hoistway and 19 is the elevator car at the highest position in the hoistway 1.

In such, the elevator system, the control panel 6 is disposed within the hoistway and above the protrusions such as landing floor door mechanism 14, the landing floor sill 15 and the building structure member 16 projecting into the hoistway, and has the structure having a thickness projecting to the position above the car door mechanism. It is to be noted that the elevator car 2 does not interfere with the control panel 6 because the latter is disposed above the highest position 19 in the hoistway. Therefore, the thickness of the control panel 6 can be designed without being limited by the dimensions of the protrusions from the hoistway wall. Also, the amount of protrusion of the control panel above the car can be receded by an amount corresponding to the dimension of the above protrusions, so that the interference at the time of maintenance on the car top can be alleviated. By making the protrusion extend above the door mechanism on which no one steps during the maintenance, almost no obstacle is generated. Also, the surface of the control panel is close to the maintenance area on the car, so that the maintenance of the control panel is easy.

#### INDUSTRIAL APPLICABILITY

According to the present invention, a control panel for controlling the movement of a vertical moving member is disposed within a hoistway and in an overlapping relationship with a projected region of a protrusion of a building structural member or an equipment attached to the building wall in the direction of movement of said vertical moving member, so that the so-called machine room is not necessary and the control panel can be installed without the fear of interfering it with the vertical moving member travelling within the hoistway.

Also, the control panel is positioned above an opening portion in the hoistway wall for providing an access to the hoistway, so that, since no vertically elongated elevator member is not installed immediately at the opening portion, the control panel mounted above the opening portion does not interfere with the above-mentioned members, so that no difficulty is paused in maintaining the control panel.

Also, the control panel is installed above the landing floor door mechanism, so that the control panel can be easily accessed and maintained by opening the landing floor door mechanism and stepping on the car top.

Further, the control panel is disposed at a position above the highest position of the vertical moving member within the hoistway, so that the thickness of the control panel can be designed without being limited by the dimensions of the protrusions from the hoistway wall, and the amount of protrusion of the control panel above the car can be receded by an amount corresponding to the dimension of the above protrusions, so that the interference at the time of maintenance on the car top can be alleviated. Also, the surface of the control panel is close to the maintenance area on the car, so that the maintenance of the control panel is easy.